This is a year long graduate level course in the college of business. It focuses on subsistent marketplaces cross-taught by business and engineering faculty. Students identify technologies and develop products for subsistence marketplaces. The course spans business to engineering in terms of content. It covers, at one end, the bottom-up understanding of buyers, sellers, and marketplaces beyond literacy and resource barriers. At the other end, it covers the technologies that could be used to develop innovative products. In between, the course covers issues in product and market development as well as the nature of research methods to employ.

**Course Timeline**

- **Aug.**
  - virtual immersion in subsistence context

- **SEPT.**
  - analysis of interviews
  - project groups are formed and projects begin

- **OCT.**
  - very broad scale concept generation begins
  - ideas for trip generation
  - group travels to India beginning in Chennai, then Delhi, Agra, and Jabalpur finishing back in Delhi

- **NOV.**
  - develop materials for trip
  - wide concept generation
  - mid-term presentation and final concept selected

- **DEC.**
  - 2nd semester starts, trip reflections

- **JAN.**
  - narrow ideas start weighing concepts on criteria and needs
  - choose top 3 concepts and expand on them
  - create matrices to judge designs on

- **FEB.**
  - 2nd semester starts, trip reflections

- **MAR.**
  - continue working on final concept and begin writing up business plan

- **APR.**
  - full business plan should be written up

- **MAY**
  - final presentation
The Prompt | Integrated Lightweight Disaster Shelter

Professor Hammann and his team developed a lightweight disaster shelter for Cambodia a couple years ago. He came to us for help expanding his initial design to fit in a central and south Asia context. His initial design fits 6 people and can be assembled and transported by 2 people. It is self sufficient in terms of water and electricity. As of now this design is only a patented idea and has never been tested or prototyped.

Recently there has been a spike in natural disasters around the world. Most natural disasters occur in central and south Asia. Since this courses focuses on subsistence living in India it provides an excellent opportunity to research the needs of the target user group for a disaster situation.

Opportunities for Improvement

The Asian continent is hit the hardest by natural disasters. Designing a shelter specifically for hot humid climates would account for much of the affected area.

We have the opportunity to extensively research Indian culture and Indian people and specify their needs.

Our interdisciplinary team adds multiple views and expertise to the project.

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The First Steps

The first few months we focused mainly on familiarizing ourselves with the culture and lifestyle of Indian people.

Our activities:
- Poverty Simulation Exercize
- Reading first-hand interviews with below poverty line people in India
- Learning the nuances of subsistence marketplaces

In preparation for our trip to India we developed a tent manual to fit an existing tent. The purpose of this was to see how Indian people take direction and what they can and can not understand in a manual. The design for this manual has no text. It is color coded in order of sequence and for the different parts.

The manual design was simplistic utilized color to differentiate utilized symbols to indicate to manual is as universal as possible so language is not a barrier.
Empathic Excursion | research trip to India

The Interview Process
Over the course of the trip we interviewed many people. Most of the interviewees were below the poverty line and had been effected by the Indian Ocean Tsunami.

Tent Simulation
Tsunami survivor volunteers used our manual to try and assemble the tent we brought. Two groups participated. The first were two male tsunami survivors. They were not giving a manual at first. They had never seen a tent before and eventually we had to give them a manual just so they could see what the product looked like. The second group consisted of a teenage girl and a middle aged man. They were given a manual to look at and fared a little better then the first group. They still struggled with the details and outside people kept coming over to help.

Some common themes we found throughout the interviewees:

Privacy
Our western notion does not apply here. People choose to have little privacy and they enjoy begin together.

Materialism
Tangible possessions are not as important as community and people.

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they were afraid to put the tent on the ground

putting tension on the poles to raise them was an abstraction

trying to match the same color pole with it’s hook

they were given the manual to help finish the tent

group 1

they had an easier start because they had watched the first group

putting the right end of the pole took to 20 minutes to figure out

the man did most of the work

friends kept coming over and adding their input

group 2

the girl mostly observed

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**Anchal Non-governmental Organization**

Anchal is a NGO based in north Delhi they specialize in women's right and provided disaster relief to the annual floods that flood part of Delhi every year. They provided us with some valuable insight for out project.

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**Sadurangapattinam Village**

Sadurangapattinam Village was heavily effected by the Indian Ocean Tsunami in 2004. They are located off the coast of the Bay of Bengal about 2 hours outside of Chennai. We had the opportunity to tour their village and talk to the people about their experiences during and after the tsunami hit.

The village's sole livelihood is fishing. It is the reason they wanted to stay in the village even after it was destroyed. These thatch huts are common living arrangements and all of them were destroyed in the tsunami.

This is a refugee's home. Even 6 years after the disaster their house has still not been rebuilt, and without help from the government they do not have the funds to rebuild.

Children gathered to watch us as we toured the village.

A villager describing the huge wave of the tsunami. They had no idea what it was and had no prior warning before hand to evacuate.

These are the ruins of the sanitation station that the government set up after the tsunami.
COMMUNITY plays are huge role in subsistent villages. Villagers rely on and support one another.

Every village has a central HUB where important social and economically interactions take place.

LOCAL ECONOMY is important in maintaining the villages structure.

The villager's livelihood is what keeps the community close. In times of disruption people needs to be able to maintain there LIVELIHOOD.

Rebuilding can be a slow process. A RETURN TO NORMALITY may take years.

Villagers often do not trust “higher” technology if they can not understand how that technology works. An appropriate level of technology needs to be supplied for villagers to actually utilize it.
gutter filters water internally so people don’t have to worry about manually purifying their water

water channels into a communal water storage creating a place for gathering

ladder swings up and latches acts as a security door. The latching creates a noise which can alert the people inside when the door is being opened. This creates a sense of security.

modular shelters create a communal center. This provided more shelter and security and enables people to work together and socialize

adjustable legs allows for flooded or uneven terrain.
Refining the Shelter

Roof

Walls and Doors

Over-Hang

The roof consists of a canvas material with internal supports. The poles insert into the top capes. The roof comes assembled in piece, the users simple needs to place each pole into it's cape.

The roof's slope funnels rain water into water tanks utilizing the natural resources of the area.

Velcro slides through slots in the support poles.

Mesh material allows heat to escape.

Zippers.
Refining the Shelter

Water Tanks

- Overflow valve allows water out and prevents any foreign objects from getting in.
- Screen prevents roof debris from getting in.
- Latches onto poles for support.

Ladders

- Latches from the inside.
- Latching creates noise to alert people when the ladder is opening and closing adding a sense of SECURITY to the user.

“Pie” shaped shelters create a COMMUNITY area.

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The Almost Home Shelter | finalized design
Facilitating Normalcy

A sense of normalcy is key in allowing people to more quickly feel safe, get back to their routines, utilize their capabilities, and rebuild their lives and economies. Our design mimics the communal feel of people's actual homes and provides room to grow and customize their environment to their preferences.
Modularity provides further customization for people’s community layout. Larger spaces can facilitate normal infrastructure like schools, work places, and shops.
Security

In the West, we consider safety to be generated by enclosed walls and locking doors, through our research we found that homes in subsistence were fairly open to the outside and often did not have doors. Rather, security is provided by the surrounding homes. Neighbors live close enough to watch out for each other and ensure communal safety.

Along with the sense of safety the shelter offers another security feature. The ladders at each entrance of the structure are able to flip up and latch. The latching itself creates a noise alerting all occupants when someone is entering and exiting the shelter.
Slanted roof allows water to flow into the 2 water cisterns located at the lower end of the shelter. These cisterns have an internal filtration unit that filters and stores the water.

Water Filtration and Storage

Water can be stored in the cisterns for the individual shelters needs or water can be transferred to a communal storage container for the community’s use.
5 partially preassembled boxes arrive encouraging people to build their community together.